Architecting for Information Superiority

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In the past 24 months, the Department of the Navy Chief Information Office (DON CIO) sponsored two integrated product teams that have produced Information Technology (IT) architecture and standards guidance products that are fundamental building blocks for building an enterprise information infrastructure. These two products are for use by all DoN organizations and will enable the DoN to leverage information technology to better perform its missions.

In the mid-1990s, the General Accounting Office (GAO) published a widely acclaimed study, known as the "11 Best Practices for Information Technology." An alarming percentage of organizations implementing IT were failing, particularly in government. GAO found that in industry and government organizations that had successfully implemented IT programs, there were 11 best practices consistently and commonly employed. One of the most important of these was a defined and accepted set of IT architecture and standards. The tenets of the "Best Practices" were a foundation for the Clinger-Cohen Act of 1996, which in turn, was the genesis of the Office of Management and Budget Memorandum 97-16, Information Technology Architectures (ITA). The ITA requires the DON CIO to develop, maintain, and facilitate the implementation of the DoN's information technology architecture.

Responding to this, the DON CIO sponsored two separate, highly successful Integrated Product Teams (IPT). In the past 24 months, these IPTs have collaboratively developed two acknowledged outstanding ITA-related products. Both IPTs had representatives from each of the major Navy and Marine Corps organizations, their drafts reviewed by all Department organizations, and the final products unanimously approved by the DON CIO Board of Representatives.

The first product is the architecture document, known as the "DoN Information Technology Infrastructure Architecture (ITIA), Volume I." It was written by a 40-member Navy and Marine Corps team, led by Don Endicott of SPAWAR [Space and Naval Warfare Systems Command] and Ron Broersma, of SPAWAR [Systems} Center, San Diego. The ITIA describes the manner in which information will be exchanged over networks at the wide area, the metropolitan area, and the campus area. The complex document defines the ITI components, identifies demarcations, selects protocols, describes network services, suggests best practices, establishes performance metrics, and states how security mechanisms will be employed.

The second product is a standards document, known as the "DoN Information Technology Standards Guidance (ITSG)." It was written by an IPT led by Randy Cieslak, of SPAWAR and CINCPACFLT [Commander-In-Chief, U.S. Pacific Fleet]. The ITSG identifies and describes IT specification standards, products, and best practices for the DoN based on established criteria of security, functionality, interoperability, performance, and cost. A feature throughout the ITSG is the depiction of the recommended, emerging, and not recommended standards or technologies, to be used in conjunction with the ITIA by all Navy and Marine Corps IT managers for consistent IT planning, development, and implementation.

The ITIA successfully developed a solution path by acknowledging the multitude of legacy physical networks in the DoN that must be accommodated, and the diversity of the customer communications requirements—operational, organizational, and functional—which must be supported. The resulting solution is a network of networks, that must be melded to attain the required functionality, interoperability, and security across the DoN in the near term, and a

long-term strategy by which the DoN will build a more integrated and efficient enterprise infrastructure over time. The "glue" that melds these networks together is the detailed description of network services, such as domain naming, directory, and security services, that provide the basis for network components to interconnect and operate.

The ITIA uses the basic construct of the Open System Interconnect model to address the transport and applications-related layers that provide the network connectivity and services. Throughout this array of network layers and entities, there is a well-developed and integrated description of network security mechanisms that form a "Defense in Depth." The ITIA appendices provide specific guidance and decision making tools (including performance metrics) for planners of metropolitan area and campus area networks.

The ITSG amplifies the ITIA to describe how the components of the architecture must connect and interoperate at their boundaries. This is absolutely essential where there are multiple, decentralized implementations that must be complementary and interoperable. The most visible example of this is the ITSG's series of "continuum" charts that identify the emerging standards, the current standards, the projected standards, and the not recommended standards. This allows planners, implementers, and acquisition personnel to anticipate changes in standards and specifications, thereby, allowing multiple DoN organizations that are implementing networks in a decentralized fashion, to be successful.

The sequence of the ITIA and ITSG document development resulted in temporary overlaps in the type of information presented in each document. Now that the ITIA has been published, some of the process and service descriptions that are more architecture-oriented will be removed from the ITSG. To use a town planning analogy, the intent for the architecture (ITIA) is to describe the way the building design and services address required customer functionality, and for the building codes (ITSG) to detail the specific interfaces and products that should be used. This alignment of information will be performed during subsequent updates of the two documents.

The importance of collaboration and ownership of these two documents by the organizations within the Navy and Marine Corps is absolutely essential. It is likewise essential to have the participation, contribution, and buy in of the DoN IT managers and engineers. Both ITIA and ITSG contain time-sensitive data rendering them out-of-date in a matter of months. As customer requirements change, and as emerging IT products enable new communications capabilities and processes, updated architecture and standards must support these to support improved warfighting and business capabilities.

During the fall, the DoN IT Architecture and Standards IPT will reconvene to update these two documents. Both the ITIA and ITSG are available on the World Wide Web at **http://www.doncio.navy.mil.** If you have ideas for either the ITIA or ITSG documents, you should contact Richard Lynch, DON CIO Enterprise Architecture and Standards at **lynch.richard@hq.navy.mil.**

Editor's Note: Turner is the Deputy DON CIO for Technology. This information is in the public domain at **http://www.doncio.navy/comm/articles/chips/information.html.**